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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/589,048	06/11/2007	Joachim Berthold	FR 6162 (US)	5475
24114	7590	02/16/2011	EXAMINER	
LyondellBasell Industries Legal IP Department 1221 McKinney Street One Houston Center Houston, TX 77010			SINGH, PREM C	
			ART UNIT	PAPER NUMBER
			1771	
			NOTIFICATION DATE	DELIVERY MODE
			02/16/2011	ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

Patents-US@lyondellbasell.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/589,048	<b>Applicant(s)</b> BERTHOLD ET AL.	
	<b>Examiner</b> PREM C. SINGH	<b>Art Unit</b> 1771	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 17 December 2010.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 11-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 11-23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 August 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>12/17/2010</u> .  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12/17/2010 has been entered.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 11 and 18-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Promel et al (US Patent 6,225,421) ("Promel") in view of Job et al (US 2002/0128401) ("Job") and German, Jr. et al (US Patent 4,337,069) ("German").

4. With respect to claims 11 and 23, Promel discloses a suspension process for preparing ethylene polymers (See column 1, lines 48-58; column 3, lines 5-10) having a bimodal mass distribution from a monomer and at a comonomer (See column 1, lines 5-9, 63-67; column 2, lines 1-4; column 6, lines 25-27) in at least two reactors which are connected in series (See column 1, lines 48-51) and comprise different reaction conditions within each of the reactors (See column 12, Table 5) wherein the process comprises subjecting the suspension to a reduction in pressure so as to remove the diluent, the ethylene, the hexane and optionally, the hydrogen from the composition

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(See column 5, lines 22-25). Promel further discloses using hydrogen, inert and the monomer in the first stage of the reactor (See column 3, lines 11-16, 26-36).

Promel also discloses a good yield with low content of oligomers generally comprising at least 99 wt% of the combination of homopolymer and copolymer (See column 5, lines 41-45; column 6, lines 10-15). Promel's silence on after-reactor clearly indicates that the invention avoids an after-reactor.

It is to be noted that Promel produces the polymer in a plant (See Examples 8, 9R, 10), which is expected to be a continuous process.

Promel does not appear to specifically disclose collecting off gases leaving all the reactors, compressing and cooling in a gas scrubber, and recycle of gaseous and liquid portions to the reactors.

Job discloses a process of olefin polymerization using a feed, catalyst and operating conditions (See paragraph 0032, 0073, 0075) similar to Promel. Job also discloses that it is preferred to condense at least a portion of the recycle stream (See paragraph 0074). Job further discloses removal of hydrogen, inert and unreacted olefin from the reaction products and recycle to the reactor (See paragraph 0076, 000079). Job also discloses that a stream containing unreacted monomer is withdrawn from the reactor continuously, compressed, cooled, partly or fully condensed and recycled to the reactor (See paragraph 0076).

Job does not appear to specifically disclose cooling off gases in a gas scrubber.

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German discloses an apparatus for gas phase olefin polymerization recycle gas scrubbing tower (See title; abstract). German also discloses, "Typically off-gases leaving the polymerization reactor, together with some entrained polymer fines, are fed to a recycle scrubber tower. Contact with circulating quench liquid, or liquid monomer, partially condense the reactor off-gas. After condensate is circulated and cooled, it can be returned to the upper portion of the scrubber or returned to the reactor as quench liquid. Overhead gas from the scrubber tower can be separated further and can be compressed for return to the reactors in a regulated stream" (Column 3, lines 52-61, emphasis added). German's disclosure indicates that the flow of recycle gases is regulated. German further discloses, "Such recycle scrubber typically is a high flow unit in which substantial quantities of off-gas and condensate are circulated" (Column 3, lines 61-63).

In view of Job disclosing compressing and cooling the off gases and German disclosing that recycle scrubber is a high flow unit in which substantial quantities of off-gas and condensate are circulated, it would have been obvious to one with ordinary skill in the art at the time of invention to modify Promel process and use compressing and cooling off gases as disclosed by Job and German for recycle of gaseous and liquid components to the polymerization reactor for an economical process.

5. With respect to claim 18, Promel invention discloses use of hydrogen and transition metal catalysts, including Ti and Zr, in the suspension process (See column 3,

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lines 31-36; column 4, lines 16-25), however, the invention does not appear to specifically disclose use of Ziegler-Natta catalyst.

Job discloses use of Ziegler-Natta catalyst species which denotes any of the known metal species useful in polymerizing olefins that are present in Ziegler-Natta catalysts. For example, the species can include Ti, Hf, V, Cr, Zr and the like (See paragraph 0032). Obviously, combined Promel and Job's disclosure indicates that one with ordinary skill in the art would use any transition metal or Ziegler-Natta catalyst in the olefin polymerization because Ziegler-Natta catalyst comprises transition metals.

6. With respect to claim 19, Promel invention discloses a first reactor comprising hydrogen and at least one comonomer (1-hexene), the hydrogen being present in a concentration higher than the hydrogen concentration in the downstream reactor, and the comonomer (1-hexene) concentration in the first reactor being lower than the comonomer concentration in the downstream reactor (See column 3, lines 31-36, 53-65 column 4, lines 1-15; Table 1).

7. With respect to claim 20, Promel discloses production of a polyolefin polymer comprising ethylene and a polyolefin polymer of an alpha-olefin comprising 6 carbon atoms (1-hexene) (See Table 1, 2).

8. With respect to claim 21, Promel discloses suspension medium comprising a saturated hydrocarbon comprising from 3 to 8 carbon atoms (See column 3, lines 5-17).

9. With respect to claim 22, Promel discloses removing hydrogen and inert gas from the suspension process (See column 3, lines 37-40; column 5, lines 28-40).

Although Promel invention does not appear to specifically disclose branching off of the off gas stream from the first reactor, however, the invention does disclose that the first reactor, in comparison to the second reactor, has higher concentration of hydrogen and lower concentration of monomer and comonomer (See column 3, lines 31-36, 53-65; column 4, lines 1-15; Table 1). Promel also discloses that the ratio of the concentration of hydrogen in the diluent in the first reactor to the concentration in the subsequent polymerization reactor is about 200 (See column 3, lines 61-67). This indicates that the hydrogen requirement in the subsequent reactor(s) diminishes sharply, and it would have been obvious to one with ordinary skill in the art at the time of invention to modify Promel invention and branch off the offgas from the first reactor to reduce hydrogen fed to the subsequent reactor(s).

10. Claims 12-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Promel et al (US Patent 6,225,421) ("Promel") in view of Job et al (US 2002/0128401) ("Job") and German, Jr. et al (US Patent 4,337,069) ("German") and further in view of Mehra et al (WO 96/27634) ("Mehra").

11. With respect to claims 12-17, Promel/Job/German invention does not appear to specifically disclose the pressure and temperature of the compressed gases before and after cooling.

Mehra discloses an absorption process for rejection of reactor byproducts and recovery of monomers from waste gas streams in olefin polymerization process (See title and abstract). Mehra also discloses details of waste gas stream [10], compressed gas [14] cooled gas [18] (See figure 1; Example 1, page 25; Example 2, page 26; Example 3, page 27; Example 4, page 28). Mehra further discloses temperature and pressure of stream [10], [24] and [22]. This indicates that Mehra is expected to be achieving temperature and pressure of compressed gases before and after cooling in a range as claimed.

In view of Mehra teaching the temperature and pressure of different streams, it would have been obvious to one with ordinary skill in the art at the time of invention to modify Promel/Job/German invention and specify the temperature and pressure of compressed gases before and after cooling for proper characterization of compressed gases for recovery of monomers and other constituents.

### ***Response to Arguments***

12. Applicant's arguments filed 12/17/2010 have been fully considered but they are not persuasive.

13. In the arguments on page 4-6, the Applicant argues that:

Promel does not specifically disclose cooling of the compressed off-gases, instead using a distillation column to separate the compressed gaseous mixture

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into liquid and gas and recycling to the reactor. However, the Examiner then seeks to remedy the deficiencies of Promel by applying Job. The Examiner argues that Job's paragraph [0076] teaches the cooling step. First, Job refers to U.S. Patent No. 5,462,999 of Griffin et al. ("Griffin") as exemplifying the cooling of a stream containing unreacted monomer. However, Griffin refers to a conventional heat exchanger: Second, Promel's distillation column includes an intermediate draw off, i.e., ethylene and hydrogen are being taken off the top of the column, isobutane and hexene off the bottom, and this would render Promel unsatisfactory for its intended purpose, since it would prevent the isobutane-hexene mixture from being recycled to a subsequent polymerization reactor and the isobutane devoid of hexene being recycled to the first reactor. (col. 5, lines 37-40). Third, one skilled in the art would not look to use a scrubber in a process such as that claimed. Gas scrubbers are mainly used in chemical processes for purifying gaseous streams, such as industrial exhaust streams. Cooling with a gas scrubber is, however, unusual, and furthermore, also not appropriate for cooling recycle gases in a fluidized bed reactor (FBR).

In response, it is the examiner's position that Promel discloses two options for separating off gases from the reaction mixture: Option one in which, "The suspension is usually subjected to a reduction in pressure (final reduction in pressure), so as to remove the diluent, the ethylene, the hexene and, optionally, the hydrogen from the composition" (column 5, lines 20-25). Option two: "According to an alternative form of the process according to the invention and more particularly when the diluent is

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isobutane, the gases exiting from the first reduction in pressure .....and from the final reduction in pressure are mixed, compressed and conveyed to a distillation column” (Column 5, lines 26-32, emphasis added). Thus, the use of a distillation column is an alternative only while using isobutane as a diluent.

German discloses use of a gas scrubber to cool and separate off gases from a polymerization unit for recycle to the reactors (See Office action above under claim 11).

14. In conclusion, the claimed invention is *prima facie* obvious over Promel in view of Job, German and Mehra.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PREM C. SINGH whose telephone number is (571)272-6381. The examiner can normally be reached on 7:00 AM to 3:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on 571-272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

PS 021011

/PREM C SINGH/  
Primary Examiner, Art Unit 1771